TECHNICAL REVIEW DOCUMENT FOR OPERATING PERMIT 95OPMR050

to be issued to:

Western Sugar Company - Fort Morgan Facility Morgan County Facility ID 0870001

Prepared on March 6, 1997 Revised on July 31, October 23, 199 & January 9, 1998 Peter K. Nelson, Review Engineer

> Revised on March 5, 1998 Vincent L. Brindley, Review Engineer

I. Purpose

This document will establish the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered within the Colorado Title V Operating Permit proposed for this site. It is designed for reference during review of the proposed permit by the EPA, during Public Comment, and for other interested parties. Information in this report is primarily from the application received on March 1, 1995, additional information received on July 3, 1995; September 20, 1995; February 14, 1997 and a compliance order on consent signed August 20, 1996. In addition, a site visit was conducted on November 3, 1995 to confirm the information in the application. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

II. Source Description

This facility manufacturers sugar and sugar by-products from sugar beets classified under the primary Standard Industrial Classification of 2063. The facility generally operates approximately 5 months per year beginning, typically, in mid-September. During this time, the plant is in operation for 24 hour/day, seven days per week until all harvested beets have been processed. This period of operation, which can range from about 100 to 170 days and averages about 140 days, is called a "campaign". The exception to this is the sugar storage bins and associate dust collectors which operate year round as sugar is shipped. Preventive maintenance and overhaul activities are performed during the off-campaign months. The facility is located in the town of Fort Morgan bordered by Interstate 76, State Highway 52, and State Highway 144. There are no affected states within 50 miles of the plant. There are no Federal Class I designated areas within 100 kilometers of the plant. The area in which the plant operates, Morgan County, is designated as attainment for all criteria pollutants.

The source is considered to be a major source (Potential To Emit (PTE) > 250 Tons Per Year (TPY)) for purposes of the Prevention of Significant Deterioration (PSD) program. Construction of the facility and subsequent modifications occurred prior to PSD promulgation. Additionally, no major modifications as defined under Colorado Regulation Number 3, Part A have occurred which would trigger PSD review. Facility wide emissions are as follows:

Pollutant	Potential To Emit	1995 Actual Emissions
	(TPY)	(TPY)
NOx	990.6	345.6
CO	837.2	121.5
SO_2	2292.7	18.7
VOC	85.8	2.0
PM	576.6	71.1
PM_{10}	325.1	52.8
HAPs	10.53	7.27

Potential emissions are based upon existing Colorado Construction Permit limitations for particulate ans SO₂ and the operation of unpermitted equipment at 8760 hours/year without any controls. Actual emissions are based upon the last Air Pollution Emission Notices (APENs) received by the Division. This facility is required to provide an updated APEN in the event that emissions of any of the above air pollutants increase 5% or 50 tons per year (actual emissions) whichever is less, above the level reported on the last APEN submitted to the APCD. Under the guidelines of EPA's Whitepaper for streamlining the operating permit process, actual emissions for the last data year were not required during the application process. Therefore, the Division assumes that emissions from this facility have remained the same or decreased since the last APEN submittal based upon the compliance certification in the operating permit application. The major HAP component above consists of ammonia, a state-only HAP.

III. Emission Sources

The following sources are specifically regulated under the terms and conditions of the proposed Operating Permit (Permit) for this site (note that monitoring refers to periods of operations - ie: monthly opacity observations are not required when the plant is shut down):

- 1. Emission Unit S001 Two Babcock and Wilcox Stoker-Coal-Fired, Model Rotograte RG-4 #2016 and 2017 (Job # RG 859), Steam Boilers Each with a Maximum Heat Input Rate of 145 mmBtu/hr.
 - **a. Emission Permits** The boilers were originally constructed in 1947 to burn coal. At that time, no emissions program was in place. The boilers were converted to natural gas in the 1960's and in September of 1975, an application was made to convert the boilers to coal and install a venturi scrubber system. The units were then issued permit number C-11, 262 (August 18, 1977) under the facility name of The Great Western Sugar Company. The permit was amended on October 13, 1977 and final approval was granted on March 21, 1978. A transfer of ownership to the Western Sugar Company resulted in the permit being re-issued as 11MR262 on December 24, 1986.
 - **b.** Applicable Requirements- The following terms and conditions of 11MR262 have been incorporated into the Proposed Operating Permit as applicable requirements: 20% opacity; Lbs/mmBtu limitations for particulate matter (PM) and sulfur dioxide (SO₂); general operating requirement.

While the PM and SO_2 limitations were taken from the construction permit, they were first derived from Regulation No. 1. The PM standard (Section III.A.b) is calculated using the equation PE = 0.5 (FI)^{-0.26}, where PE are the Particulate Emissions in Lbs/mmBtu and FI is the Fuel Input Rate in mmBtu/hr. The PE limitation for emissions from each boiler are then calculated to be 0.14 lbs/mmBtu. Both boilers feed a common stack and allowable emissions from that stack are then 0.14 lbs/mmBtu.

It is easy to make a mathematical error in determining the PE limitation where two boilers feed a single stack. In Western Sugar's case, it would appear that the PE limitation should be 0.14 + 0.14 = 0.28 lbs/mmBtu. However, this is not the case. An explanation follows below:

Section III.A.1.d of Regulation No. 1 states, "If two or more fuel burning units connect to any opening, the maximum allowable emission rate shall be calculated by summing the allowable emissions from the units being operated."

The allowable emissions, for fuel burning equipment designed with heat inputs greater than $1x10^6$ BTU per hour, but less than or equal to 500×10^6 BTU per hour, are governed by the equation:

EQ 1: PE=0.5(FI)^{-0.26}
where PE= Particulate Emissions in lbs/mmBtu heat input
FI= Fuel Input in mmBtu per hour

An example of the problem surrounding the summation of the allowable emissions is outlined below:

For Boiler #1 burning at 100 mmBtu/hr Heat Input Rate, PE_1 =0.15 lb/mmBtu. If a second boiler, Boiler #2, was also burning at 100 mmBtu/hr Heat Input Rate, then its allowable emissions, PE_2 , would be 0.15 lb/mmBtu as well. It would appear that if they both exhaust to the same stack the combined emission limit, as stated in Regulation No. 1, should be $PE_1 + PE_2 = PE_{total}$. This would give $PE_{total} = 0.30$ lb/mmBtu.

However, the fallacy of this approach becomes evident when the emissions are converted into a lb/hr format. This is done by multiplying the allowable emission rate by the heat input rate. $PE_1 = 0.15$ lb/mmBtu x 100 mmBtu/hr = 15 lb/hr. Since $PE_1 = PE_2$, $PE_2 = 15$ lb/hr as well and $PE_1 + PE_2 = 30$ lbs/hr. But, if we do the same for the PE_{total} above we find that it does not equal 30 lbs/hr but instead $PE_{total} = 0.30$ lb/mmBtu x 200 mmBtu/hr (both heat rates combined) = 60 lb/hr, which is double what it should be. Thus, in the case of Western Sugar's boilers, while emissions from the stack are limited to 0.14 lbs/mmBtu, taking the two 145 mmBtu/hr boilers into account allows for 20.3 lbs/hr + 20.3 lbs/hr = 40.6 lbs/hr particulate emissions (twice that of a single boiler).

The SO₂ standard (Section IV.A.a.i) is 1.8 lbs/mmBtu for units with a heat input from coal or coal-based by-product of less than 300 million BTU per hour.

The permit also required that the control equipment be maintained at a removal efficiency of 97.6% for particulate matter. There are no continuous emissions monitors (CEMs) which would allow for the determination of the removal efficiency on a continuous basis. Periodic stack testing is possible but would be overly burdensome and costly. Instead, the facility will be required to demonstrate maintenance of the control equipment and perform an emissions test every five (5) years. The

lbs/mmBtu limitations from 11MR262 were derived from the PM and SO₂ standards in Colorado Regulation No. 1.

c. Emission Factors- Emissions from the coal fired boilers are produced from the combustion of organic matter and inorganic mineral matter. This facility is using bituminous coal, by far the largest group of coals, characterized by their volatile matter, sulfur content, slagging and agglomerating characteristics.

Coal burning boilers have numerous methods for introducing the coal to the boiler. This boiler is considered a spreader-stoker and is equipped with a Detroit Stoker coal feeder. With this type of unit a mechanical or pneumatic feeder distributes the coal uniformly over the surface of a grate moving in the opposite direction. This creates a suspension burn and a thinner fast-burning fuel bed. The amount of fuel fed depends upon the fuel size and composition as well as air flow velocity.

The main pollutants of concern when burning coal are PM, PM under 10 microns (PM₁₀), SO₂, and Oxides of Nitrogen (NOx). Lesser quantities of Carbon Monoxide (CO), Volatile Organic Compounds (VOC), Lead, and Hazardous Air Pollutants (HAPs) are also emitted. The relative quantities of each pollutant are dependant upon the type of coal burned and the combustion temperature. The amount of SO₂ emitted is directly proportional to the sulfur content in the fuel. As such, the emission factor for SO₂ must be multiplied by the weight percent sulfur (S) in the fuel. Because this boiler also has a control device (described later), the emissions for PM and PM $_{10}$ are multiplied by the control efficiency (assumed to be 97.6% - confirmed by stack testing).

Western Sugar will be using general EPA approved emission factors to determine emissions. In general, AP-42 emission factors are accepted as representative for this boiler and are typically of good quality. EPA Document 450/4-90-003, <u>AIRS Facility Subsystem- Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants</u>, essentially places AP-42 data into easily used tables. Western Sugar will be using Bitumous Coal Spreader-Stoker emission factors for emissions and compliance purposes for all except PM emissions. Particulate emissions were measured in an October 22, 1996 stack test and will be used instead. The factor used was supplied by the facility, is after controls, and includes a safety factor. The emission factors used are listed below:

SCC: 1-01-002-04		
POLLUTANT	EMISSION FACTOR	
	Lbs/Ton Coal	
PM^1	1.76 (Includes Control Efficiency)	
PM_{10}	12.0	
SO_2	$39.0 (S)^2$	
NOx	14.0	
VOC	0.07	
CO	5.0	

¹From October 22, 1996 Stack Test

²Where (S) is the weight percent of sulfur in the coal. The weight percent is multiplied by the emission factor to give an adjusted emission factor which then takes the sulfur content of the fuel

into account.

d. Monitoring - Conditions 1.1 to 1.9 of the Operating Permit list the Monitoring and Recording provisions necessary to verify compliance with applicable requirements for these boilers.

The source will monitor fuel usage by daily tracking of the number of coal cars used to fuel the boilers. On an annual basis, the number of coal cars, coal shipment data, and leftover coal will be used to calculate the amount of coal used during the year.

Additionally, the sulfur, sodium, ash, and heat content of the fuel burned will be determined on each occasion that coal is delivered using American Society for Testing and Materials (ASTM) standards. [Note that Colorado Regulation No. 1, Section VI.C.1.d. specifically states the ASTM analysis methods to be used for calculating the BTU and sulfur content of the coal used.] These values will be used in emissions calculations and to demonstrate compliance with sulfur and ash/sodium limitations. The sulfur monitoring satisfies the requirement under Regulation No. 1, Section IV, to have a Division approved sampling plan in order to calculate sulfur oxide emissions on any fossil fuel fired steam generator of a total rated capacity of or greater than 250 million BTU per hour heat input. The facility has determined that compliance with the particulate standard is dependent upon the composition of the coal burned. Specifically, emissions tests performed in December of 1995 and October of 1996 showed that the facility can demonstrate compliance when the Sodium Content is less than 0.25 lbs/mmBtu or the Ash to Sodium Ratio is greater than 40. The sodium content in the ash appears to alter the slagging and burn characteristics of the coal and, in this instance, reduces particulate emissions.

Compliance with the Regulation No. 1 PM standard will be determined on a monthly basis using the heat content of the fuel burned, the given compliance emission factor, and an assumed control efficiency of 97.6%. Compliance with the Regulation No. 1 SO₂ standard will be determined on a monthly basis using the heat content of the fuel burned, the given compliance emission factor, and the measured weight percent of sulfur in the fuel. These calculated values will then be compared to the standards. Additionally, a stack test will be required every 5 years from the date of permit issuance as an additional compliance check for PM and SO₂ values (lbs/mmBtu) and to ensure scrubber integrity. Results from the stack test indicating a failure to meet either limitation for PM or SO₂ will be a violation of the operating permit terms and may result in a re-opening of the permit to adjust the level and/or frequency of monitoring.

Because the boilers were constructed in 1947, they do not have long or short term emission limitations outside of the Regulation No. 1 standards. However, pollutant emissions of NOx, CO, VOC, SO_2 , PM and PM_{10} must be calculated on an annual basis for inventory and fee purposes.

Emissions from the boilers are not to exceed 20% opacity as measured using EPA Method 9. This method requires 24 consecutive 15-second readings taken over a 6 minute period. Opacity observations must be performed by personnel certified as opacity readers. During normal operations, an opacity observation will be performed within one calendar day of concluding startup and every other week thereafter. The startup period shall begin when a fire is first lit and end when sufficient steam pressure is present to operate the wet scrubbers. Should the source record eight (8) weeks worth of data showing that opacity did not exceed 10%, then the frequency will be moved to a

monthly basis. Any opacity over 10% will result in the frequency reverting to ever other week. Note that the 10% opacity requirement (also included for the other sources) is not a regulatory standard, but is used only as a means to control the monitoring frequency. Regulation No.1 also allows, under certain circumstances (fire building, cleaning of fire boxes, soot blowing, start-up, process modification or adjustment of control equipment), for opacity to exceed 20% but not more than 30%. Start-up is initiated when a fire is first lit for the boilers. Start-up is completed when sufficient steam is generated to begin operating the scrubbers. Under these situations, an opacity reading will be taken within 24 hours of startup and every calendar day thereafter during startup. This includes any period when the boilers are backed-down such that steam pressure is unavailable for the wet scrubbers. A startup parameter report must also be submitted to the Division addressing fuels used, hot and cold startups, the average and maximum time required for startups, and lists of parameters and their values indicating commencement and completion of startup.

The boiler emissions are controlled by an American Standard (Series 361) fly ash collector and two low-energy venturi "wet" scrubbers with a combined stack containing a chevron-type mist eliminator. A venturi scrubber operates by passing the flue gas from the boilers through a venturi tube to which low-pressure water is added at the throat. The impingement of the water droplets on the flue gas acts to remove particulate matter and to a much lesser degree SO_2 . However, this scrubber system is not specifically designed to remove gaseous SO_2 . As such, no removal efficiency is assumed when calculating SO_2 emissions. A control removal efficiency of 97.6% is assumed for PM and PM_{10} . Calculations using AP-42 emission factors and this efficiency correlate well with actual test data.

The scrubber system is vital to this source meeting the Regulation No. 1 particulate standard. The source will continuously monitor the pressure drop (an indicator of proper operation) and shall not have a pressure drop of less than 2.5" of water. Total water flow rate will also be measured continuously with a flow rate greater than 200 gallons per minute required. These levels were determined from a series of tests performed in 1996. Additionally, the scrubbers will be maintained and operated in accordance with manufacturer's instructions to minimize emissions. Records of maintenance will also be kept to detail that the equipment is in good operating condition.

e. Compliance Status - A historical review of this facility revealed the following:

- 1) <u>Particulate and SO2:</u> The boilers and associated control equipment were tested in 1977 and demonstrated compliance with the SO2 and PM standards. Since that time, no additional testing was required by the Division. On October 20, 1995 Western Sugar submitted a voluntary self-disclosure pursuant to Senate Bill 139 revealing non-compliance with the particulate standard and Colorado Construction Permit # 11MR262 for these units. A Compliance Order on Consent (Attached) was issued by the Division on August 20, 1996 regarding the non-compliance incident. A compliance test on October 22, 1996 demonstrated compliance with the SO₂ and particulate standards.
- 2) Opacity: On November 12, 1980; December 16, 1986; December 7, 1987; and December 13, 1988 opacity from the boiler-venturi stack was observed to be in excess of 20%. A Notice of Violation (NOV) was issued on December 23, 1986 for the 1986 opacity exceedance. Opacity observations since 1991 have shown that the boilers typically have had an average opacity of 10-15%. However, an opacity observation on December 10, 1996 showed that visible emissions had dropped under 10% when the facility used coal with an ash to sodium ratio greater than 40.

To date, the facility has met the requirements of the Compliance Order. Based upon recent compliance testing and opacity observations, this facility is considered to be in compliance with all applicable requirements for the units covered under S001.

2. Emission Unit S002- Two Stearns/Rogers, Peabody Type MU24 (Order # 32971, 34882 -1952), Natural Gas Fired Beet Pulp Dryers Rated at 50 mmBtu/hr Each.

The process consists of two (North and South) natural gas fired pulp dryers. Pulp which has had the majority of its sugar content removed is pressed by pulp presses to reduce the moisture content to approximately 75%. From there, the pulp enters the drum-type dryers which reduce the moisture to about 10%. The pulp is fed to a conveyor system while emissions from each dryer are exhausted through two sets (for each dryer) of 4 Emtrol cyclones. Material dropped out in the cyclones is added to the conveyor.

- **a. Emission Permits** These units went into service in 1954. In 1987, due to the low cost of coal, the facility considered modifying these dryers to burn coal. Three permits (87MR196 1-3) were issued for initial construction. The project was continually delayed and the permits expired on January 28, 1994 (Division correspondence dated 10/13/92). Because the dryers were constructed prior to February 1, 1972, the units are considered grandfathered from construction permitting requirements. No modifications or reconstruction have taken place since installation to trigger additional requirements.
- **b.** Applicable Requirements- Because the units are grandfathered, there are no specific NOx, CO, VOC, or SO₂ emission limitations. However, emissions of these pollutants must still be calculated for fee and inventory purposes.

The dryers are subject to the particulate standard for manufacturing processes as stated in Colorado Regulation No. 1, Section III.C.1.a. The regulation required that the process meet a lbs/hr PM emission limit (PE) based on the following equation:

$$PE = 3.59 (P)^{0.62}$$
 where $P = Process Weight Rate in Tons per Hour$

The PE for each associated manufacturing process, when operated at the maximum capacity of 25 Tons/Hr is 26.41 lbs/hr. Proper operation of the control equipment is vital to meeting the particulate standard.

The units are also subject to the 20% opacity limitation.

c. Emission Factors - Emissions from a portion of the process are produced from the combustion of natural gas. When combusting natural gas in a boiler, the main pollutants of concern are NOx and CO. However, the process of drying pulp also produces particulate matter.

In December of 1994, the North Dryer was tested for emissions. It should be noted that the listed emission rate for PM was after the control devices and therefore takes the combustion and

production process as well as the control efficiency of the cyclones into account. The emission factors are listed below:

DECEMBER 1994 STACK TEST		MARCH 5, 1998 DECISION
POLLUTANT	EMISSION FACTOR	EMISSION FACTOR ***
	<u>Lbs/Hr</u>	Lbs/Ton Pulp
PM	14.1	0.564
PM_{10}	14.1	0.564
SO_2	0.72	0.0288
NOx	4.73	0.189
VOC	9.4	0.376
CO	56.1	2.244

***Note

A decision was made by the Division on March 5, 1998 to convert the above emission factors to a lb/Ton of beet pulp throughput using the maximum process rate of 25 ton/hr. With the emission factors in lb/hr and the emission limit in lb/hr, the source could never be out of compliance. Since Western Sugar is already required to record the pulp throughput, no additional monitoring requirements will need to be added. This change will not alter the calculated emissions for this point.

d. Monitoring - Conditions 2.1 to 2.6 of the Operating Permit list the Monitoring and Recording provisions necessary to verify compliance with applicable requirements for these boilers. Because the emission factors take fuel combustion and process rates into account, the source needs only to keep track of the beet pulp throughput and operating hours to calculate emissions (see paragraph below). However as mentioned above, the proper operation of the control equipment is vital to ensuring compliance with the particulate standard(s). Therefore, language was included to require that the cyclones be maintained and operated in accordance with the manufacturer's instructions to minimize emissions and ensure compliance with the particulate and opacity standards. Records of cyclone maintenance shall also be kept.

Compliance with the opacity standard will be demonstrated initially by a monthly EPA Method 9 visual observation. If after the first campaign no observation results (6 minute average) shows opacity above 10%, then the source will be allowed to perform one EPA Method 9 observation per campaign. Any EPA Method 9 result (6 minute average) above 10% will require the source to perform monthly opacity observations for a period of one year. Additionally, visual checks of visible emissions will be conducted monthly. Because this source typically emits steam along with some opacity, the source will need to verify that the process and control equipment are operating properly. The source will also perform any maintenance or adjustments necessary to minimize emissions/opacity and ensure proper operation. Finally, the control equipment must be in operation when the manufacturing process is operating.

e. Compliance - No compliance problems have been noted for these units. The units are currently considered in compliance with all applicable requirements.

3. Emission Unit S003 - Four Beet Pulp Pelletmills and Coolers.

The dried pulp from S002 is fed to an "elevator" and then another conveyor to be fed to four pelletmills. The mills compress the dried pulp into hard pellets which are then used for livestock feed. Cooling fans take emissions from the mills and go through a common in-house designed cyclone. Drop-out from the cyclone is recycled to the pelletmills.

- **a.** Emission Permits- The units were installed and began operation in 1953 with no further modifications or reconstructions. Because the units were constructed prior to February 1, 1972, they are considered grandfathered from construction permitting requirements.
- **b. Applicable Requirements-** Because the emission units are grandfathered, there are no specific annual emission limitations. However, emissions of these pollutants must still be calculated for fee and inventory purposes.

As with S002, the emission unit is subject to the particulate standard for manufacturing processes. Total production is given as 14 tons/hour (TPH) for all four pelletmills (Title V Application, P003, Form 306). Using the manufacturing equation from S002 results in a PE limitation of 18.44 lbs/hr. The mills are also subject to the 20% opacity limitation.

c. Emission Factors - No specific emission factors for beet pulp pellet mills are available. A Western Sugar factory in Billings, Montana was tested for their pelletmills resulting in an emission rate of 0.138 lbs/ton. However, the controls for the mills were slightly more stringent and the factors are not completely transferable. The EPA document AP-42, Compilation of Air Pollutant Emission Factors lists emission factors for operations at alfalfa dehydrating plants. The basic operation of a beet pulp pelletmill is similar to that at an alfalfa dehydrating plant. Therefore, the pelletmill cooler cyclone emission factor under Table 6.1-1 (4/76) was analyzed for compatibility. The emission factors are:

TABLE 6.1-1 and SCC: 3-02-001-02
POLLUTANT EMISSION FACTOR
Lbs/Ton Product

PM 3.0
PM₁₀ 1.8

The listed emission factors apply to emissions calculated from tons of finished product. Should calculations be made using the amount of "wet feed" to the dryers, AP-42 suggests that the emission factor be divided by a factor of 4 to compensate for the increased throughput weight due to higher input moisture content (ie: tonnage input is approximately 4 times the output tonnage due to moisture loss). Each pelletmill then has an emission rate of 0.75 lbs/ton for PM and 0.45 lbs/ton for PM₁₀. While Western Sugar will not be using the "wet feed" throughput, it appears from the Billings data that the emissions are closer to 0.75 lbs/ton than they are to 3.0 lbs/ton. Therefore, the 0.75 lbs/ton emission factor will be used based upon Best Engineering Judgement. Because each pelletmill is identical, total emissions are the equivalent of a single mill processing all of the pulp. For simplicity, calculations in the permit assume a single mill processes all of the pulp. Western Sugar will be calculating emissions based upon dried pulp fed to the pellet mills. Western sugar

measures the amount of "wet feed" to the dryers as well as the "wet feed" moisture content and resultant "dry pulp" moisture content. The amount of dry pulp sent to the pelletmills is then calculated based upon the amount of original "wet feed" and the moisture loss through the dryers.

- **d. Monitoring** Conditions 3.1 to 3.4 of the Operating Permit list the Monitoring and Recording provisions necessary to verify compliance with applicable requirements for these units. The tonnage of dry beet pulp sent to the mills will be measured and recorded on a monthly basis along with the mill's monthly operating hours. The cyclone shall be maintained and operated in accordance with good operating procedures to minimize emissions and ensure compliance with the particulate and opacity standards. Records of maintenance will be kept. Compliance with the opacity requirement will be ensured by using the same procedures as discussed under S002.
- **e.** Compliance No compliance problems have been noted for this emission unit. This source is currently considered in compliance with all applicable requirements.
- 4. Emission Unit S004 Two Sugar Granulators (East and West) consisting of Two Steam Heated Rotary Dryers and Two Ambient Air Cooled Rotary Coolers.

As part of the crystallization and separation process, partially wet spun sugar from the white centrifugals moves by conveyor to one of two sugar granulators to be dried and cooled. The rotary dryers are heated using steam produced from S001, and the sugar moves transverse to inlet air and steam. The hot sugar then drops to the sugar coolers which are essentially identical to the granulators except that the transverse inlet air is not heated. The exhaust from the dryers and coolers enters one of two large area ducts where water is sprayed across the top. Water and sugar dust are returned to the process while entrained dust is emitted by a stack to atmosphere.

- **a. Emission Permits** The exact date of construction for these units is unknown, however, Western Sugar places it prior to 1950. It should be noted that the sugar processing facility was constructed in 1906 and much of the equipment installed during the last 50 years is still in use today. Because these units were constructed prior to February 1, 1972, they are considered grandfathered from construction permitting requirements. No modifications or reconstructions have taken place to trigger additional requirements.
- **b. Applicable Requirements Discussion-** Because the emission units are grandfathered, there are no specific annual emission limitations. However, emissions of these pollutants must still be calculated for fee and inventory purposes.

As with S002 and S003, the emission units are subject to the particulate standard for manufacturing processes. For each granulator, the allowable Particulate Emissions (PE) rate using the manufacturing equation from S002 is calculated using the given maximum design process weight rate of (per granulator) 15.625 ton/hr. Each granulator's PE is then calculated to be 19.7 lbs/hr. The units are also subject to the 20% opacity limitation.

c. Emission Factors- Specific emission factors for these activities are not available from published

sources. The emission factors used in the operating permit were based on Western Sugar's best engineering judgement and include removal efficiency by the control device. It is assumed that PM is equal to PM10. The emission factors are listed below.

Pollutant	Emission Factor	
	Lbs/Ton Sugar Throughput	
PM	0.08	
PM_{10}	0.08	

d. Monitoring - Conditions 4.1 to 4.4 of the Operating Permit list the Monitoring and Recording provisions necessary to verify compliance with applicable requirements for these granulators/coolers. The throughput tonnage of sugar will be measured and recorded on a monthly basis along with each granulator's operating hours. The dust boxes shall be maintained and operated in accordance with good operating procedures to minimize emissions and ensure compliance with the particulate and opacity standards. Records of maintenance will be kept.

This source has not historically had an visible emissions other than steam. Compliance with the opacity standard will therefore be demonstrated by a monthly visual check (not EPA Method 9) of emissions. Should opacity, other than steam, be observed, then manufacturing process and control equipment will be checked for proper operation and corrected/adjusted if necessary. An additional visible check will be conducted after examining the process and control equipment. If visible emissions still persist, the source will be required to perform an EPA Method 9 observation. Should an EPA Method 9 observation result (6 minute average) show opacity above 10%, the source will be required to perform monthly EPA Method 9 observations for the next four (4) months. The source will continue these observations into the next campaign should the plant cease operating prior to the completion of this requirement. If no further instances of opacity above 10% are observed, then the source may continue with the original monitoring scheme requiring monthly visual checks. As mentioned above, the control equipment must be operating during the manufacturing process.

- **e. Compliance -** No compliance problems have been noted for these activities. The activities are currently considered in compliance with all applicable requirements.
- 5. Emission Unit S005 One Cleaver Brooks, Model CB760-250, S/N: L-35634, Natural Gas Fired Steam Boiler with a Maximum Design Heat Rate of 10.461 mmBtu/hr.

Heat and steam used to condition sugar or keep molasses warm enough to pump.

- **a.** Emission Permits- The unit was installed and began operation in 1965 with no further modifications or reconstructions. Because this unit was constructed prior to February 1, 1972, it is considered grandfathered from construction permitting requirements.
- **b. Applicable Requirements** Provided that this unit operates less than 2959 hours per year it is exempt from reporting and permitting requirements. Therefore, it was removed from the permit and

is listed in application as an insignificant activity. It is only mentioned here as the unit should be considered for PTE consideration. There is no regulatory requirement for Western Sugar to report on this unit or file Revised APENs. However, the unit may not be operated more than 2959 hours per year without first obtaining a modification to the Operating Permit. Note that this type of requirement applies to any equipment which subsequent to Operating Permit issuance becomes subject to reporting requirements.

c. Compliance - No compliance problems have been noted for this activity. This unit is currently considered in compliance with all applicable requirements.

6. Emission Unit S006 - Conveyor Transfer Points and Silo Filling.

Finished sugar is transferred to silos via enclosed conveyors. The process is entirely indoors. An interior air handling system collects air-borne sugar from various pick-up points and by way of a Wheelabrator 126-D, Sock Type Dust Collector allows the facility to recoup sugar which otherwise might go to atmosphere or be disposed of as waste.

The facility will be upgrading the control equipment for this emission point sometime in the near future. This will involve installing two Sly PleatJet baghouses for dust collection from conveying, elevators, productions scales, screens, and bins. A MikroPulsaire baghouse will also be installed for the powered bin vents. This modification will reduce potential emissions while meeting the most current National Fire Protection Association codes for the prevention of dust fires and explosions.

- **a.** Emission Permits- The collection device was installed and began operation in 1959. Because this unit was constructed prior to February 1, 1972, it is considered grandfathered from construction permitting requirements. The upgrade in control equipment is not considered a modification since there will be a decrease in emissions.
- **b. Applicable Requirements** The emissions associated with this activity are subject to the particulate standard for manufacturing processes. Because the process weight rate for sugar transferred is greater than 30 tons per hour, Regulation No. 1, Section III.C.1.b. applies where the following equation is used:

$$PE = 17.31(P)^{0.16}$$

Again, P is the process weight rate in tons per hour. For this activity, using the given maximum design process weight rate of 60 ton/hr the PE is then calculated to be 33.3 lbs/hr. The activities are also subject to the 20% opacity standard.

c. Emission Factors- The emission factors for the original control equipment and transfer/conveying are based upon the EPA Document AP-42, Compilation of Air Pollutant Emission Factors, 13.2.4.3 - Predictive Emission Factor Equations, 1/95. The emission factors are:

Pollutant	Emission Factor	Emission Factor March 5, 1998
	Lbs/Hr Sugar throughput	Lbs/Ton Sugar ***
PM	3.43	0.057
PM_{10}	1.72	0.029

The upgraded control equipment emission factors are based upon manufacturer guarantees and air flow. The emission factors are:

Pollutant	Emission Factor	Emission Factor March 5, 1998
	Lbs/Hr Sugar throughput	Lbs/Ton Sugar ***
PM	0.778	0.013
PM_{10}	0.386	0.0064

***Note

A decision was made by the Division on March 5, 1998 to convert the above emission factors to a lb/Ton of sugar throughput using the maximum process rate of 60 ton/hr. With the emission factors in lb/hr and the emission limit in lb/hr, the source could never be out of compliance. Western Sugar will need to record the throughput of sugar if this is not already a value that is recorded. This change will not alter the calculated emissions for this point.

d. Monitoring - Conditions 6.1 to 6.4 of the Operating Permit list the Monitoring and Recording provisions necessary to verify compliance with applicable requirements for the original "Wheelabrator" setup while 6.5 to 6.8 cover the upgraded control equipment.

The source will be required to track hours of operation, sugar production during the Beet campaign, and quantity of sugar shipped during the Inner campaign on a monthly basis for use in calculating emissions for compliance, fee, and inventory purposes. The control device shall be maintained and operated in accordance with good operating procedures to minimize emissions and ensure compliance with the particulate and opacity standards. Records of maintenance will be kept. As with source S004, this emission unit has a history of no visible emissions. Compliance with the opacity requirement will be identical to that described for S004. It should be noted that Western Sugar is concerned about the feasibility of performing a Method 9 observation for this emission source. The exhaust point is between silos, the silos are white, the exhaust (sugar) is white, and the sun angle is poor. Despite this difficulty and comment, the opacity requirements were kept in the permit.

e. Compliance - No compliance problems have been noted for these activities. The activities are currently considered in compliance with all applicable requirements.

7. Emission Unit S007 - Slaking/Hydration of Calcium Oxide from Lime Kiln

Burned lime from the lime kiln goes to the lime slaker where it is mixed with sweetwater (filtrate and wash water from the purification and filtration processes) and produces milk of lime. The milk of lime is used to precipitate or flock out non-sugars by gradually elevating the pH. Steam and dust

from the lime slacker is sent to the slaker vent which is controlled by a Ducon Wet Scrubber.

- **a. Emission Permits** The unit was installed and began operation in 1959 with no further modifications or reconstructions. A Ducon Wet Scrubber was added in 1992. The addition of the scrubber did not meet the definition of a modification since emissions decreased. Because this unit was constructed prior to February 1, 1972, it is considered grandfathered from construction permitting requirements.
- **b. Applicable Requirements-** As with S002, the emission unit is subject to the particulate standard for manufacturing processes, $PE = 3.59 (P)^{0.62}$. Using the maximum design rate, P, of 10.42 ton/hr results in a PE limitation of 15.35 lbs/hr. The slaker vent is also subject to the 20% opacity limitation.
- **c. Emission Factors** Specific emission factors for this activity is not available from published sources. The emission factors used in the operating permit were based on emission stack testing at Western Sugar's Scottsbluff, Nebraska facility. PM_{10} emissions were tested and is assumed that PM is equal to PM_{10} . The emission factors are listed below.

Pollutant	Emission Factor	Emission Factor March 5, 1998
	<u>Lbs/hr</u>	Lbs/Ton Limestone ***
PM	0.57	0.055
PM_{10}	0.57	0.055

The Scottsbluff emissions are on an uncontrolled basis. In calculating emissions for the Fort Morgan facility, a minimum control efficiency of 50% is given to the Ducon Wet Scrubber based upon best engineering judgement. Even with the control efficiency included, emissions calculations are extremely conservative.

***Note

A decision was made by the Division on March 5, 1998 to convert the above emission factors to a lb/Ton of limestone used using the maximum process rate of 10.42 ton/hr. With the emission factors in lb/hr and the emission limit in lb/hr, the source could never be out of compliance. Western Sugar will need to record the quantity of limestone used if this is not already a value that is recorded. This change will not alter the calculated emissions for this point.

d. Monitoring -Conditions 7.1 to 7.4 of the Operating Permit list the Monitoring and Recording provisions necessary to verify compliance with applicable requirements for this activity.

The source will be required to track operating hours and limestone use on a monthly basis for use in calculating emissions for fee and inventory purposes. The control device shall be maintained and operated in accordance with manufacturer's specifications to minimize emissions and ensure compliance with the particulate and opacity standards. Records of maintenance will be kept. As with source S004, this emission unit has a history of no visible emissions. Compliance with the opacity requirement will be identical to that described for S004.

e. Compliance - No compliance problems have been noted for this emission unit. This source is currently considered in compliance with all applicable requirements.

8. Emission Unit S008 - Fugitive Dust Emissions from Truck Traffic and Exposed Grounds

- **a.** Emission Permits- The activities noted have been in operation prior to February 1, 1972 and are considered grandfathered from construction permitting requirements.
- **b.** Applicable Requirements During the campaign, traffic is approximately 400 trucks per week. The majority of these trucks unload beets to a beet pile. Later they are put into another truck where they are dumped into a wet hopper. The facility also ships finished product (pulp pellets and sugar) 52 weeks per year at a rate of about 100 trucks per week as well as general miscellaneous traffic. Exposed areas such as the general plant grounds, mud ponds, lime ponds and ash lifts are also sources of fugitive emissions.

Control measures and operating procedures shall be employed as necessary to minimize fugitive particulate emissions into the atmosphere (Colorado Regulation No. 1, Section III, Part D). This source is not currently required to submit a fugitive dust control plan. However, a control plan may be required should the Division determine that visible emissions are in excess of 20% opacity; or visible emissions are being transported off the property; of if the activities are operating to create a nuisance.

- **c. Emission Factors -** Specific emission factors for these activities are available from AP-42, Section 11.2. Fugitive emissions from this facility are not used in determining PSD applicability. Additionally, Colorado does not charge annual emission fees for fugitive emissions. Therefore, the source is not required to calculate fugitive emissions for purposes of this permit.
- **d. Monitoring** Control measures and operating procedures shall be employed as necessary to minimize fugitive particulate emissions into the atmosphere. These may include, but are not limited to, watering or chemical stabilization of unpaved roads; restricting the speed of vehicles; revegetation or reclamation; or the minimization of disturbed land.
- **e. Compliance -** No compliance problems have been noted for these activities. The activities are currently considered in compliance with all applicable requirements.

9. Emission Unit S009 - Powdered Sugar Production: Two Powder Mills, Production Powder Sugar Line Packer, Truck Unloading, Warehouse Fugitives

Two classifying mills grind sugar and mix it with starch to produce powdered sugar. Each mill sends the sugar to a Fabric Filter Air system (Model 121R-10-TRL) baghouse type control systems. The filters contain the sugar and feed it to a packaging line. Emissions from the packaging line and general warehouse are collected by a single TORIT/Day Donaldson (Model 3-18) fabric cartridge filter. Sugar recovered from the filter is recycled.

- **a. Emission Permits** A Colorado Construction Permit was applied for on January 4, 1996 for these activities. Construction Permit # 96MR006 was then issued on June 17, 1996. Final Approval for this activity was granted on April 11, 1997 after the facility self-certified as to the compliance status of the emission unit. In the interest of expediency, the conditions of the initial approval permit were directly incorporated into the operating permit and no final approval permit was issued.
- **b. Applicable Requirements-** As with S002, the emission unit is subject to the particulate standard for manufacturing processes, PE = 3.59 (P) $^{0.62}$. Using the maximum design rate, P, of 16.5 ton/hr results in a PE limitation of 20.4 lbs/hr. However, permit 96MR006 limits the facility to PM = 3.38 lbs/hr and 6.88 TPY (PM $_{10}$ = 1.69 lbs/hr and 3.44 TPY). Only the more stringent limit from the Construction Permit will be included in the Operating Permit. The activities are also subject to the 20% opacity limitation.
- **c.** Emission Factors Specific emission factors for this activity is not available from published sources. The emission factors used in the operating permit were based on applicant and manufacturer guaranteed values for control equipment. The emission factors are listed below.

Pollutant	Emission Factor	Emission Factor March 5, 1998
	<u>Lbs/hr</u>	Lbs/Ton ***
PM	1.592	0.0965
PM_{10}	0.796	0.0482

***Note

A decision was made by the Division on March 5, 1998 to convert the above emission factors to a lb/Ton of powdered sugar produced using the maximum process rate of 16.5 ton/hr. With the emission factors in lb/hr and the emission limit in lb/hr, the source could never be out of compliance. Since Western Sugar is already required to record the powdered sugar production, no additional monitoring requirements will need to be added. This change will not alter the calculated emissions for this point.

The emission factors take into account the control efficiency removal of the fabric filters. Even with the filters taken into account, the overall emission factors are extremely conservative.

d. Monitoring - Conditions 9.1 to 9.4 of the Operating Permit list the Monitoring and Recording provisions necessary to verify compliance with applicable requirements for these activities.

The source will be required record daily operating hours for use in calculating emissions for compliance, fee, and inventory purposes. Compliance with the hourly limitation (In Compliance by Calculation), shall be ensured by maintaining and operating the control devices in accordance with manufacturer's recommendations to minimize emissions. Records of sugar production will also be kept as an additional check. Records of maintenance will be kept. While this emission point is new and therefore does not have the same extensive history of "no visible emissions" as many of the other emission points, the point is extremely well controlled. Emissions sufficient to result in a visible plume would essentially mean the loss of many tons of product. This point will also follow the opacity monitoring described for S004 above.

e. Compliance - No compliance problems have been noted for these activities. The activities are currently considered in compliance with all applicable requirements.

IV. Insignificant Activities

A list of insignificant activities was provided with the application. These items were placed in an appendix in the proposed permit so that they would be of use during inspections. Of specific interest:

In house laboratory equipment; Landscaping and site housekeeping devices; Fuel storage and dispensing equipment (under 400 gallons per day); Storage tanks with annual throughput less than 400,000 gallons and liquid stored is diesel fuels 1-D, 2-D, 4-D; or Fuel oils #1 - #6; or gas turbine fuels 1-GT through 4-GT; or an oil/water mixture with a vapor pressure lower than that of diesel fuel (0.025 PSIA). Unit S005, mentioned above, is considered an insignificant activity.

Note that Western Sugar has prepared a comprehensive list of insignificant activities for this facility. Such a list may be useful during site inspections to determine what equipment is not relevant to inspections.

V. <u>Alternative Operating Scenarios</u>

The existing control device for S006 will be upgraded sometime during the issuance of this permit. The source will therefore operated under one set of conditions (6.1 - 6.4) before the change and another set of conditions (6.5 - 6.8) after the modification.

VI. Permit Shield

The following items were identified by the applicant as specifically non-applicable to their facility:

- 1) Colorado Regulation No. 1, Section VI.B., New Sources of Sulfur Dioxide.
- 2) Colorado Regulation No. 6, Part B, II.D.1., Standards of Performance for New Stationary Sources, Standard for Sulfur Dioxide.
- 3) Colorado Regulation No. 6, Part B, II.D.1., Standards of Performance for New Stationary Sources, Standard for Particulate Matter.

The two coal fired boilers (S001) are exempt from these regulations as the boilers were not constructed, reconstructed or modified after the 1977 applicability date.

4) Colorado Regulation No. 6, Part B, III., Standards of Performance for New Stationary Sources, Standards of Performance for New Manufacturing Processes.

Units S002 - S007 are exempt from this regulation as they are manufacturing processes not constructed, reconstructed, or modified after the January 30, 1979 applicability date.

The facility requested that Colorado Regulation No. 1, Section III.D.1.d & e, be listed as a permit shield item. This citation covers the requirement of a facility to submit a fugitive dust control plan. While Western Sugar is not currently required to submit a control plan, the Division may require a plan as noted under S008.

VII. Accidental Release - 112(r)

Part 70 of the Clean Air Act (amended) contains the Accidental Release provisions of section 112(r). Under this program, EPA established a list of substances which pose the greatest risk of death or serious injury to humans or extreme harm to the environment. Additionally, a list of flammable substances and high explosives were set forth. Each substance was given a threshold or deminimis level by considering their individual toxicity, reactivity, volatility, flammability, explosiveness, and dispersiveness. Facilities using any of these substances in greater-than-threshold quantities are required to prepare and implement a Risk Management/Prevention Plan for those substances.

The facility is in the process of determining applicability of this provision. While the regulation become final in 1996, compliance is not required until June of 1999. Western Sugar believes that by the 1999 deadline any 112(r) chemicals in use will be eliminated or reduced to below deminimis levels.